

National Personal Protective Technology Laboratory

Supplied-Air Respirator (SAR) Conceptual Standard

Policy and Standards Development Branch

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SAR Required Technical Actions

- **Revise the Draft Standard**
 - Continue internal technical reviews
 - Post SAR draft standard on NIOSH web for public comment
 - Review additional docket comments and revise draft as required
- **Update Standard Test Procedures (STP)**
 - Eliminate obsolete STP
 - Modify existing STP
 - Develop new STP
- **Evaluate, Acquire, and Secure Test Capabilities**
 - Evaluate current test capabilities with regard to new standard
 - Purchase and install new test equipment
 - Validate test equipment and procedures

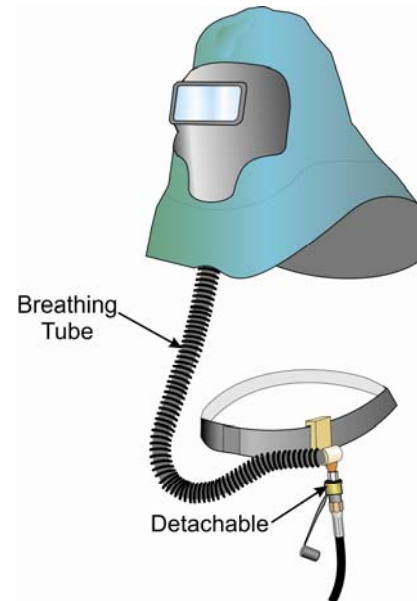
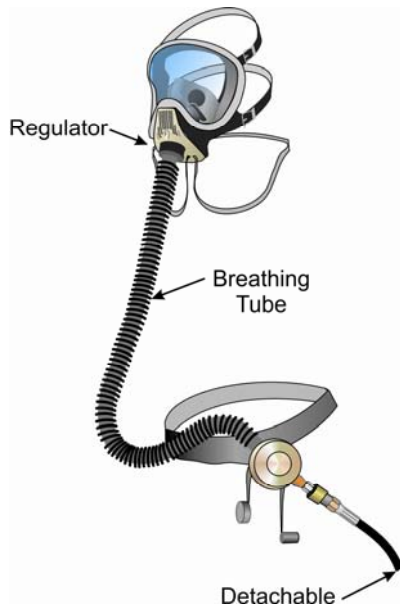
Overview of Technical Aspects Specific to Proposed Subpart J

- SAR will remain subpart J
- Subpart will contain optional requirements for both IDLH and CBRN applications
- SAR will continue to meet the requirements of Subparts A - G of 42 CFR Part 84

Highlights of Proposed Technical Updates for Subpart J Descriptions

Airline Type

- Air supply line and respiratory inlet covering with coupling for connection to Grade D or better breathing gas source

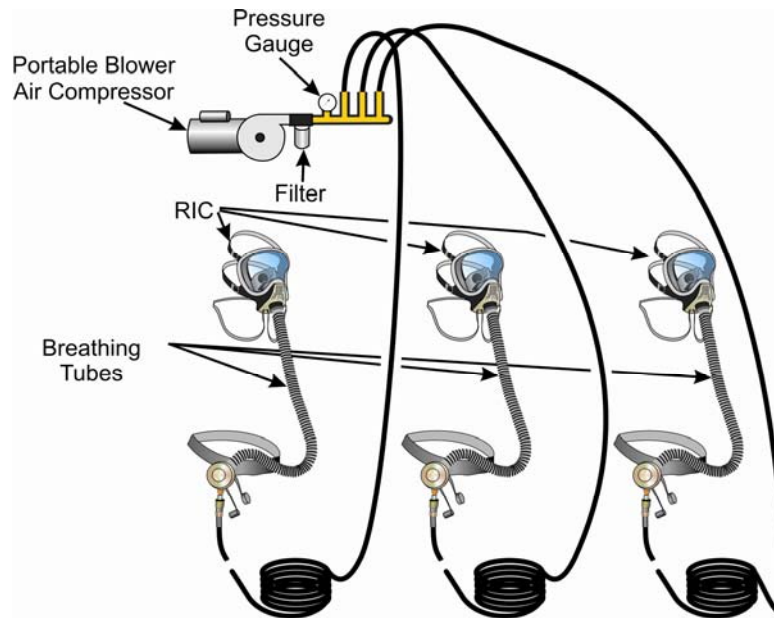


Examples of Tight and Loose Fitting Airline Type SAR

Highlights of Proposed Technical Updates for Subpart J Descriptions (Cont.)

Airsource Type

- Portable blower/air compressor with air supply line and respiratory inlet covering certified as a complete system



Typical Tight Fitting Airsource Type SAR

Highlights of Proposed Technical Updates for Subpart J Base Requirements Respiratory

Airline Type Changes

- Eliminate Type A, AE, B, and BE
- Re-designate C and CE as “Airline Type”
- Eliminate demand-type apparatus

Airline Breathing Air

- Remain unchanged with CGA G-7.1 updated

Airsource Breathing Air

- Air supply requirements: Carbon monoxide (CO) concentration, air temperature, positive pressure in the breathing zone at the manufacturers specified work rate, and filtration

Highlights of Proposed Technical Updates for Subpart J Base Requirements Respiratory (Cont.)

Exhalation Valve Leakage

- Modified maximum valve leakage from 30 to 15 ml per minute

Carbon Dioxide Limit

- Included to insure acceptable CO₂ level

Human Subject Testing

- Included to determine the carbon dioxide and oxygen levels in the breathing zone during tests performed with subjects standing and walking at 3.5 miles per hour

Fit Test

- Laboratory Respiratory Protection Level (LRPL) Test

Highlights of Proposed Technical Updates for Subpart J Base Requirements Respiratory (Cont.)

Work Rates



- Manufacturer specified work rates at which positive pressure is maintained in the breathing zone
- Replaces flow rates of 115 and 170 Lpm for tight and loose fitting respiratory inlet coverings

NIOSH Approved Work Rates		
Work Rate	Minute Volume	Tidal Volume and Respirations
Low	25 L	1.30L @ 19.2 resp/min
Moderate	40 L	1.67L @ 24 resp/min
High	57 L	1.95L @ 29.1 resp/min

Highlights of Proposed Technical Updates for Subpart J Base Requirements Non-Respiratory

Required Components

- Airline: Respiratory inlet covering, air supply valve or orifice, air supply hose, detachable couplings, flexible breathing tube, and harness
- Airsource: Respiratory inlet covering, air supply valve or orifice, air supply hose, detachable couplings, flexible breathing tube, harness, and portable blower or air compressor

General Construction

- Shall meet requirements in subpart G of 42 CFR Part 84
- Connections and couplings require at least two different motions to disconnect (prevent unintentional disconnection)

Highlights of Proposed Technical Updates for Subpart J Base Requirements Non-Respiratory (Cont.)

Harness Tests



- Shoulder strap test increased to a 300lb pull for 30 min
- Belts and rings increased to a 500lb pull for 30 min
- Hose attachment to harness remains at 250 lb pull for 30 min
- Life lines or safety harness shall meet applicable standards
- Total length of hose (heaviest configuration) shall permit dragging over a concrete floor without compromising the harness

Highlights of Proposed Technical Updates for Subpart J Base Requirements Non-Respiratory (Cont.)

Visors/Lenses

- Updated references
- Added visual field score (VFS)

Noise Level

- Generated by the respirator during normal operation at maximum airflow shall be less than 80 dBA at both ear canals

Failure Mode Effects Analysis

- Manufacturers shall demonstrate that reliability is assessed and controlled

Highlights of Proposed Technical Updates for Subpart J Base Requirements Air Supply Hose

Hose Length

- Air-supply hose length will be manufacturer specified

Hose Permeation

- Addition of permeation tests using kerosene and toluene



Highlights of Proposed Technical Updates for Subpart J Base Requirements Airsource Respirator Only

Portable

- Capable of being carried to the work location by two users (100lb max. including accessories) or manually rolled to the work location via cart mounted system (300 lb max. including accessories)

Performance Evaluation

- 8 hours a day for 15 days in the most demanding configuration

Highlights of Proposed Technical Updates for Subpart J Base Requirements Airsourse Respirator Only (Cont.)

Noise Level

- ≤ 85 dBA at any point within a 3 foot diameter circle around the portable blower/air compressor

Temperature

- System components exceeding 60 °C shall be guarded against user contact

Multiple Users

- Maximum of three users
- Designed such that each hose shall flow properly regardless of demand in other hoses

Highlights of Proposed Technical Updates for Subpart J Enhanced Requirements for IDLH Combination SAR/SCBA

Escape Cylinder



- Airline or Airsource SAR/SCBA will incorporate a 5 or 10 min. duration SCBA escape air cylinder
- A 15 minute or longer duration SCBA air cylinder allows 20% capacity for **entry**
- Automatic switch from supplied air to air cylinder
- Alarm will notify user when the system is on cylinder air
- Requires tight fitting full facepiece

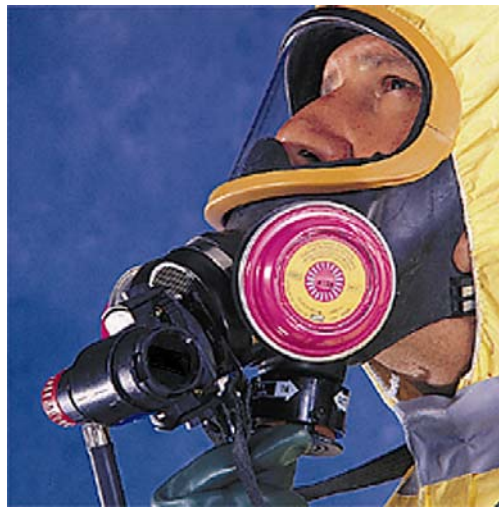
Highlights of Proposed Technical Updates for Subpart J Enhanced Requirements for IDLH Combination SAR/SCBA (Cont.)

Visor/Lenses

- Added haze, luminous transmittance and abrasion
- Low temperature/fogging

Communication

- Modified Rhyme Test (MRT)



Highlights of Proposed Technical Updates for Subpart J Enhanced Requirements Optional CBRN Protections

- Meet base and combination SAR/SCBA requirements
- 15 minute or longer duration escape air cylinder
- Automatic switch from supplied air to air cylinder
- Alarm will notify user when the system is on cylinder air
- Criteria which have been established for CBRN SCBA respirators will be applied to combination SAR/SCBA
 - Requires tight fitting full facepiece
 - Durability conditioning
 - Agent testing

Highlights of Proposed Technical Updates for Subpart J Requirements for Options

Hydration

- Drink tube valves and valve seats shall not exceed 30 ml per minute of leakage at 75 mm H₂O vacuum

Pneumatic Tool Take-Off

- Requirements for check valve and filter at the take-off point to prevent any back flow or contamination to the respirator
- Maintain positive pressure in the breathing zone at the manufacturers highest specified work rate regardless of occurrence with the pneumatic tool line such as blockage or free flow

Highlights of proposed technical updates for Subpart J Standard Test Procedures

New Procedures

- New STP or those derived from existing procedures for other respiratory protective devices

Procedures Requiring Revision

- STP already existing for SAR but requiring modification to test to the new performance standards

Obsolete Procedures

- Eliminated due to changes in the performance requirements and evaluation methods

Projected Timeline

- | | |
|---------------------|--|
| July 08: | Post SAR Concept Standard on the NIOSH Web |
| August 08: | Hold Public Meeting and Discuss Concept |
| Oct 08: | Revise SAR Concept Standard |
| December 08: | Post Updated SAR Concept Standard on the NIOSH Web |

Poster Session

Supplied-Air Respirator (SAR) Program

SAR Descriptions of Airline and

Airsource Systems

SAR Base Requirements

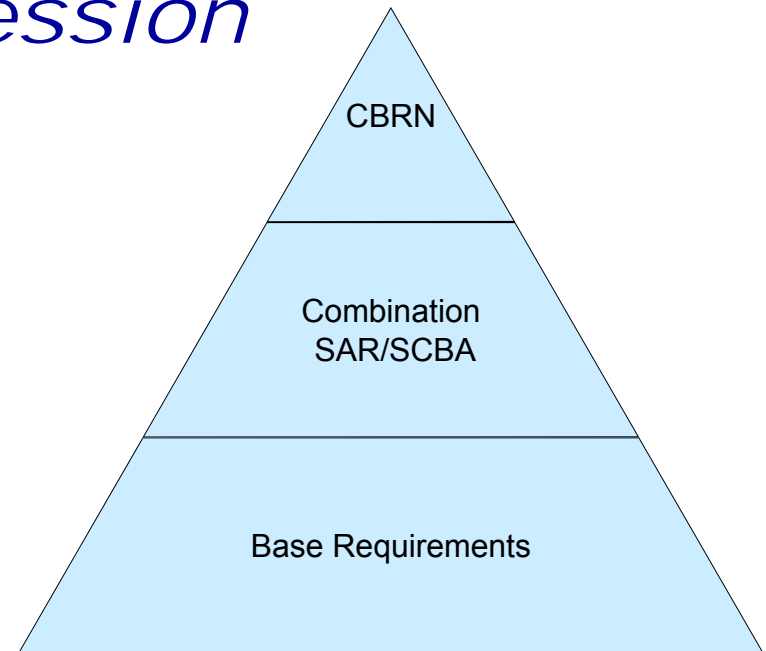
- Respiratory
- Non-Respiratory
- Airsource Blower/Air Compressor / Air Supply Hose

SAR Enhanced Combination SAR/SCBA Requirements

SAR Enhanced CBRN Requirements

SAR Work Rate and Escape Cylinder Capacity

SAR Test Procedures



Supplied-Air Respirator (SAR)

NIOSH Docket # 083

Stakeholder Input can be submitted by

- Mail:

NIOSH Docket Office

Robert A. Taft Laboratories, M/S C 34

Supplied Air Respirators (SAR) – NIOSH Docket # 083

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